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ABSTRACT

This study incorporated Internet-based instruction into two education technology courses for preservice teachers. One was a required, undergraduate, beginning-level educational computing course. The other was a graduate, advanced-level computing course. The experiment incorporated Internet-based instruction into course delivery in order to create a new paradigm in teacher education and make instruction more relevant, responsive, and meaningful. Redesigned course features included online course syllabi; online resources (e.g., World Wide Web links and study guides); a virtual classroom; fewer lectures and more guidance for using the Internet to supplement reading assignments; and online discussions. The graduate course included control and experimental groups. The experimental group had 5-10 students with access to the Internet. It met with the entire class only 2-times during the term. Course assessment included pre- and post-surveys of students' self-reported change in understanding of the impact and value of technology, comparison between experimental and control groups, followup interviews with students, and students' electronic portfolios. Results indicated that the dynamics of learning shifted from teacher-centered, lecture-driven to learner-centered, self-regulated, and needs-driven. Learners developed high level cognitive skills, critical thinking skills, and interpersonal leadership and management skills. Technology enabled students to make active contributions to the construction of knowledge. The redesigned courses promoted cooperative learning and enabled immediate feedback from instructors. (Contains 19 references.) (SM)

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The Impact of Internet-based Instruction on Teacher Education:

The "Paradigm Shift"

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The Impact of Internet-based Instruction on Teacher Education:
The "Paradigm Shift"

Statement of the Problem

One of the greatest challenges facing teacher educators as we prepare for the 21st century is how to mesh leading edge technologies with 20th century pedagogy. Nowhere is this problem more apparent and nearer crisis proportions than in Educational Technology's efforts to encourage the majority of faculty to embrace available technologies.

In 1995, the National Council for Accreditation of Teacher Education (NCATE) made standards for technology in teacher education an accreditation requirements for schools and colleges of education (Wise, 1995). Four years have past since then. Despite this recognized need and NCATE mandate, the significant amount of resources invested in technology infrastructure and increased technology access, progress in the field has been slow and often inadequate. A large percentage of teachers remain unprepared in the use of sophisticated technology. While leading edge users of cyberspace adjust to the change from a PC-centric environment to a netware-centric and digital environment, at many teacher preparation colleges, we are still struggling to find a solution to the need for value-added use of technology in the teacher preparation process. The potential of the Internet as a powerful tool to enhance teacher education and to access the wealth of information on the Internet as an instructional resource are yet to be realized.

While accessing the Internet might be relatively easy, learning to harness its full potential is not so simple. Current teacher education curricula need the technology components required for sophisticated research and learning. This involves incorporating qualitatively different ways of preparing educators consistent with our believe that pedagogy must be based on research-supported data and practice, taking maximum advantage of technology. In this paper, the author will explore the effectiveness and relative simplicity of the Internet-based instruction.

Literature Review

Several research findings suggest positive effects of technology incorporation into the learning process (Barron & Ivers, 1996; Johnston, 1996; Morgan, 1996; Cline & Mandinach, 1994; Considine, 1987). These findings provided guiding principles for the experiment herein described.

The Internet/WWW may be viewed as a worldwide repository of resources, a powerful tool for accessing and distributing information, and a means of interpersonal communication. It offers education a wide spectrum and degree of enhancements, producing "added value" in the educational process. Using the Internet for interpersonal communication offers implicit value to education which lies in the very process of learning to take advantage of a powerful communications system. This may include: Interpersonal communication via e-mail, electronic bulletin boards; remote access to information through consulting data banks, file archives; sharing teaching materials and collaborating on products. In addition to the acquisition of technical skills, the very use of the Internet has an implicit effect on cognitive learning (Trenin, 1996).

Many activities can be conducted without information technology. However, the availability of the Internet and its fast communication channels should not only be seen as a positive factor because of

its speed. It offers new stimuli, new perspectives, and new ways of approaching learning. (Jonassen, 1993).

Some learning activities are strictly dependent on the use of telematics. For example, the use of Internet in distributed learning enables an environment that overcomes spatial-temporal constraints (Nipper, 1989). Based on synchronous (e.g., chat rooms) and asynchronous (e.g., threaded discussion forums) communication, it reduces connection times to a minimum (message reading and writing is done off-line); and learners may access debate areas and/or educational materials in ways and at times that best respond to their personal needs (learning styles and rhythms) and professional needs (available time, commitments). If in-service training courses can be accessed on-line from home, the concept of a "learning society" and life-long learning can become a reality.

The Experiment

The experiment discussed here incorporated Internet-based instruction into two existing UAB School of Education (SOE) education technology courses: One is an undergraduate beginning level educational computing course required of all Teacher Education Program (TEP) students. The other is a graduate advance level educational computing course. Although it is not a required course, students taking this course represent all SOE programs. The focus was to incorporate Internet-based instruction into the delivery method of these two courses so as to bring a "new paradigm" to the practice of teacher education which makes the instruction more relevant, more responsive, and more meaningful.

Some features of the re-designed courses include:

- The course syllabi (objectives, schedule, activities, assignments, and grading) are on-line and accessible to students of the courses on and off campus at any time.
- Course content is enriched by supplementing traditional course materials (e.g., textbooks) with on-line resources including WWW links, study guides, PowerPoint presentations, and other multimedia resources. All materials are accessible at the students' finger tips, literally.
- Students are able to access course assignments/projects and the evaluation criteria on-line and are required to submit assignments on-line; they will collect electronic portfolio, and evaluate each others work using specified evaluation criteria.
- A virtual classroom has been set up to help students to get better acquainted with each other whether or not they are in the same class.
- There are few lectures. Instead, students receive guidance from the instructor necessary for gathering information through the Internet to supplement the course reading assignments.
- Students participate in asynchronized on-line discussions using threaded discussion groups.
- Students form groups around various topics covered by the course. The group members take responsibility for leading the on-line discussions of the topics. Some examples of group responsibility include: Posting questions around the topics, monitoring the discussion, responding to questions about the topic or referring questions to other individuals (the instructor or outside experts), and inspiring participation by modeling, etc..
- Group leaders are also responsible for synthesizing and summarizing discussions and presenting the result to class.
- Students communicate with each other, collaborate on projects, and help each other with questions regarding assignment requirements, evaluation criteria, deadlines, content, as well as offer additional resources.

- EDT 300 meets regularly but the class activities are for trouble-shooting, problem-solving, and helping students who want to get ahead or need to catch-up.
- EDT 630 is divided into control/experimental groups. The experimental group has 5-10 qualified students (eligibility includes owning or having access to a high standard computer with Internet connection and being reasonably computer literate). The experimental group meets with the entire class only 2-3 times during the term; the control group meets every session.

Performance Assessment

The assessment of the redesigned courses focuses on the technological, pedagogical, and affective outcomes necessary to prepare students for the "new paradigm" envisioned by leading educators and driven by information technology. Teacher education professionals are gaining new understanding of the impact of technology on society, the nature of our work life, and the role of teachers vis a vis technology. Assessment of the courses includes

- pre/post surveys of students' self-reported change in their understanding of the impact of technology on society, value of technology in education, attitudes toward technology, etc.;
- comparison between control and experimental groups;
- in-depth follow-up interviews with students to discover the long-term effect of on-line courses; and
- students' electronic portfolio of both theory-based and skill-based learning outcomes.

Positive Outcome

These activities have resulted in content-rich, technology-rich, and interaction-rich (between the instructors and students, students and students, students and experts of the field) courses. This "new pedagogy" has produced several positive results. First, the dynamics of learning shift from traditional teacher-centered, lecture-driven mode to a learner-centered, self-regulated, and needs-driven learning mode. Guided by the course objectives, students learn from reading, communicating with each other and with the professor while gathering information from the Internet and other resources as needed. Having open-discussions on-line and requiring students to submit assigned papers on-line created an opportunity they never had before to draw from each others strength while being aware of their own weaknesses. Learning occurred in a more meaningful and relevant environment.

Second, learners developed high level cognitive skills, e.g., problem-solving, the ability to compare, synthesize, and summarize (readings and discussions), critical thinking, and interpersonal, leadership, and management skills. Again, technology permits efficiencies in teaching; no time is wasted on lectures and discussions that may be relevant to only a few individuals. More time may be devoted to developing higher level cognitive skills or dealing with common concerns.

Third, technology enabled students to make active contributions to the construction of knowledge. The vast pool of information on the Internet, the technology to retrieve and organize it, and the learner's ability to make it happen is a process of turning information into knowledge, a process of turning "waste" into "gold". The process through which learners are enabled to actively participate in the construction of knowledge is known as "constructivism" (Cunningham & Duffy, 1996).

Fourth, the re-designed courses promoted cooperative learning. A virtual classroom was set up with students' pictures and bio sketches after the first meeting of the course. Students were required to "get acquainted" on-line following the second "meeting". This exercise lay the ground for class interaction and group work. Research repeatedly tells us that if people know each other, they work together better (Hamilton, 1994; Nalley, 1995; Grabinger, 1996).

Fifth, technology enables immediate feedback from the instructor to students throughout the course. Research finds that this helps the learner to make adjustment early on to reach his/her instructional goals (El-Tigi, Branch, & Maribe, 1997; Rathore, 1997).

Conclusions

It is the author's optimistic believe that this experiment contributes to the emergence of a "new paradigm", providing measured example of learner-centered learning, nurturing active learning from passive learners, and delivering information to the learner on-demand, Just-In-Time (JIT), and in a meaningful way. The "new paradigm" empowers the learner to learn, changes the role of the teacher to be more responsive, and gives teaching and learning an entire new and reciprocal meaning.

Decades of research on organizational behavior in the public and private sectors has shown that the success or failure of innovation rests ultimately on the people who implement it (Marlier, 1987; Clegg, Gowler, & Legge 1993; Cropanzono & Kacmar, 1995; Tuohy, 1996). Emerging technologies can free the instructor to act as a catalyst for student inquiry and dialogue, creating environments, as never before, that will fulfill John Dewey's vision of active, engaged learners. The implication of this experiment is to change the connotation that the Internet is just another toy – of little value in expanding knowledge or responding to the education's "paradigm shift" – teacher educators' 21st century challenge.

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